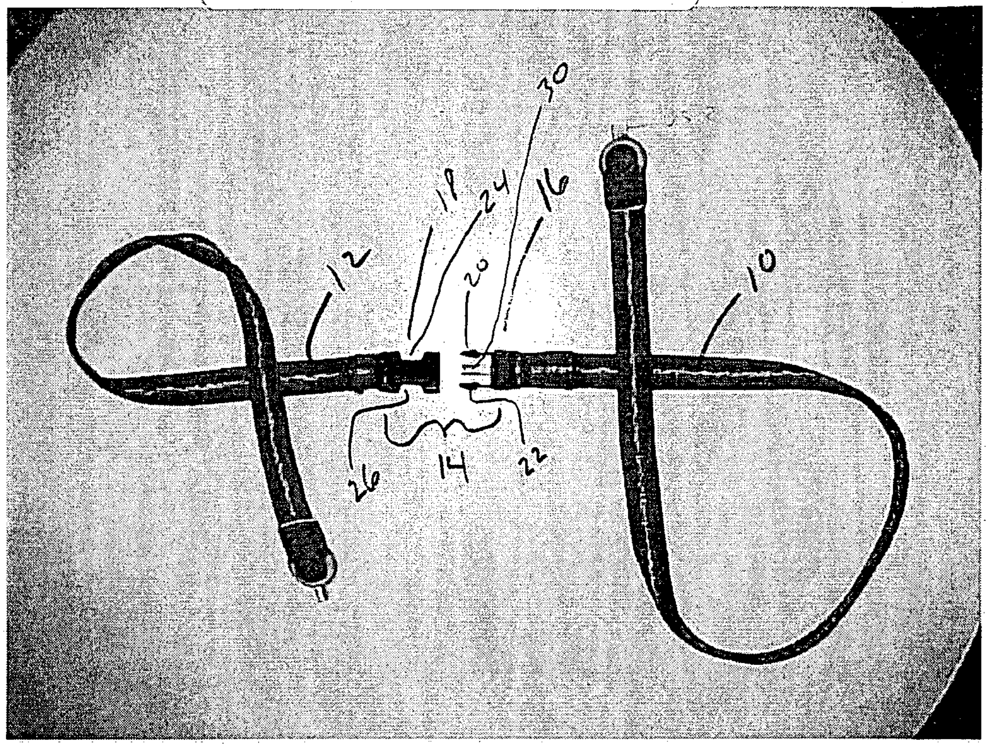


Fig 1

Figure 9: USB v1 Cable with Fastex Quick Disconnect Capability for Transmission across Boundaries. ***(This information is proprietary to Foster-Miller)***

It quickly became apparent that while functional, USB connectors would not be sufficiently rugged for military field applications. After discussions with the Army and Plastics One it was determined that we would use the same 5-pin 0F Lemo connector that was then being used on the Land Warrior 1.0 system. The 0F Lemo connector was selected due to its small size and relatively high pin count as compared with the USB connector. When mated this connector has an environmental protection index of IP67 as per the IEC 529 standard. This rating indicates that the connection is dust tight and protected from temporary immersion. Our inspection of the 0F Lemo revealed that much of the connector's bulk comes from its latching mechanism. Since the Fastex buckle connector takes up this functionality we proposed that this portion of the Lemo (Figure 10) could be removed. The stripped inner barrel of the 0F Lemo is shown in Figure 11 next to a proposed buckle connector.

While the stripped down Lemo approach did reduce connector volume and transfer latching functionality to the buckle it also removed most of the connector's water resistance in the process. Another concern with the latching mechanism on the 0F was that even if it were left intact to maintain its environmental protection it would still need to be overmolded. This procedure would immobilize or at least restrict the range of motion of the outer release sleeve of the latching mechanism, leading to an increase in the required pullout force of up to 33 lbs as apposed to the 1.8 lbs pounds encountered when the locking mechanism is disengaged. In practice however the required pullout force of the 0F with restricted release sleeve may be much less than 33lbs. Pullout tests performed

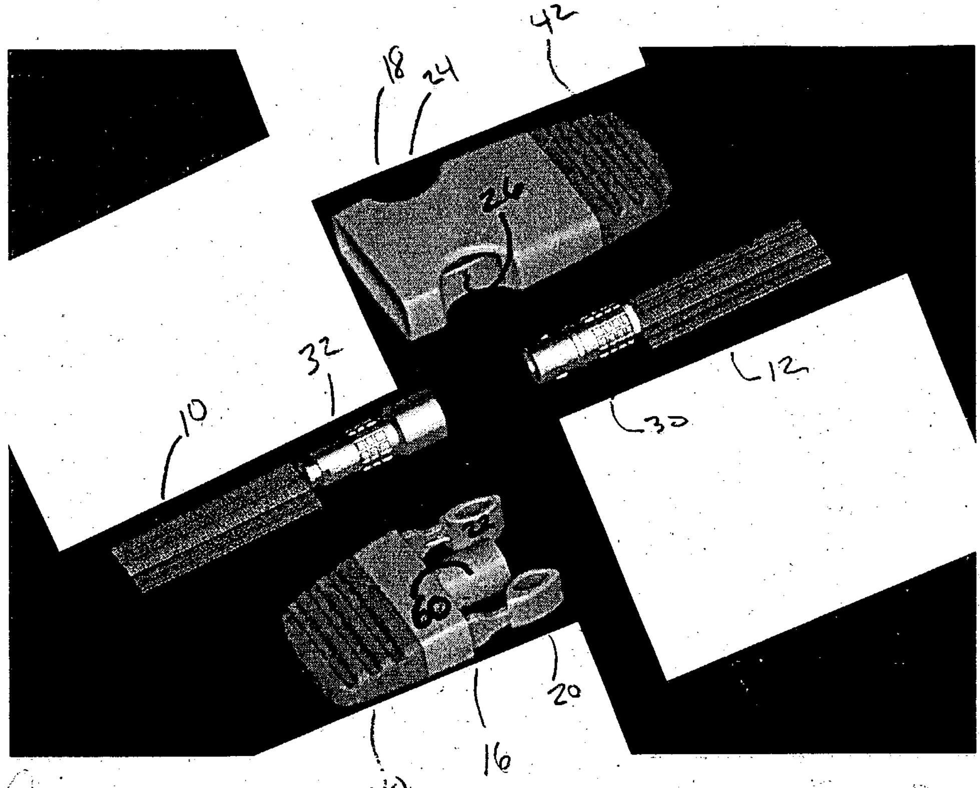


Fig 2

Figure 22: Shortened C **ctor Overmolding.** *(This information is proprietary*

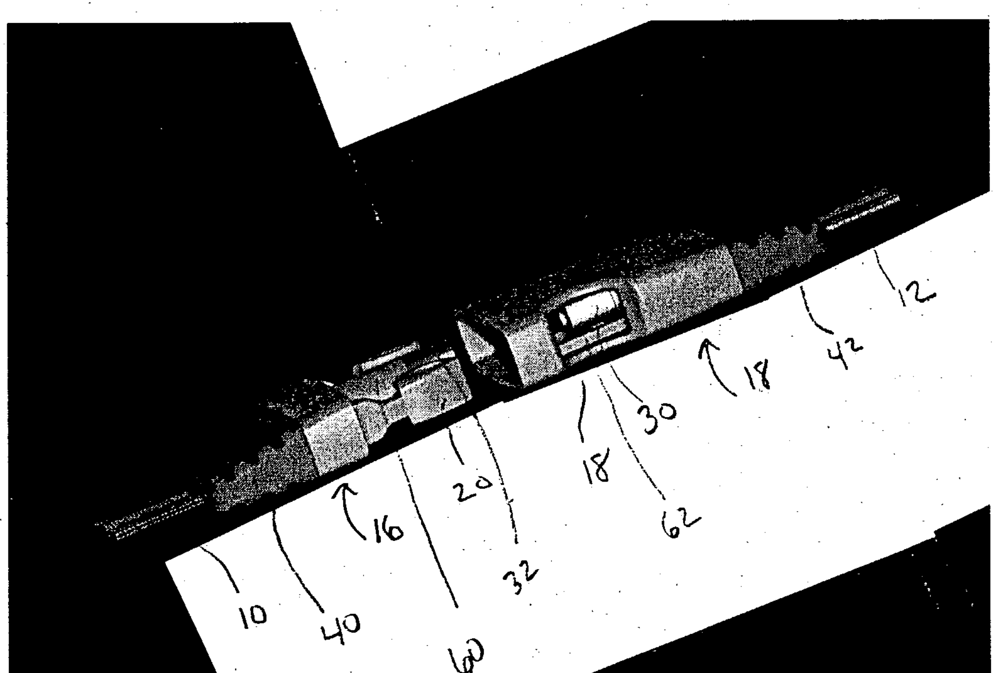


Fig 3

Figure 23: Redesigned B **nnector.** *(This information is proprietary to Foster-Miller)*

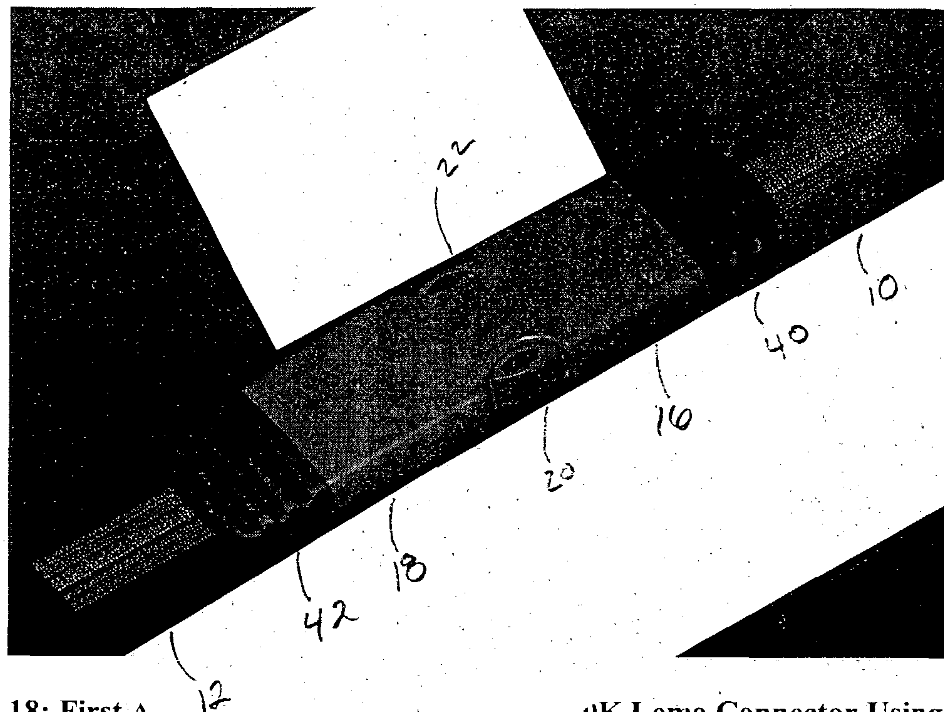


Fig. 4

Figure 18: First A   **0K Lemo Connector Using WSR-25 Connector as a** *…is proprietary to Foster-Miller)*

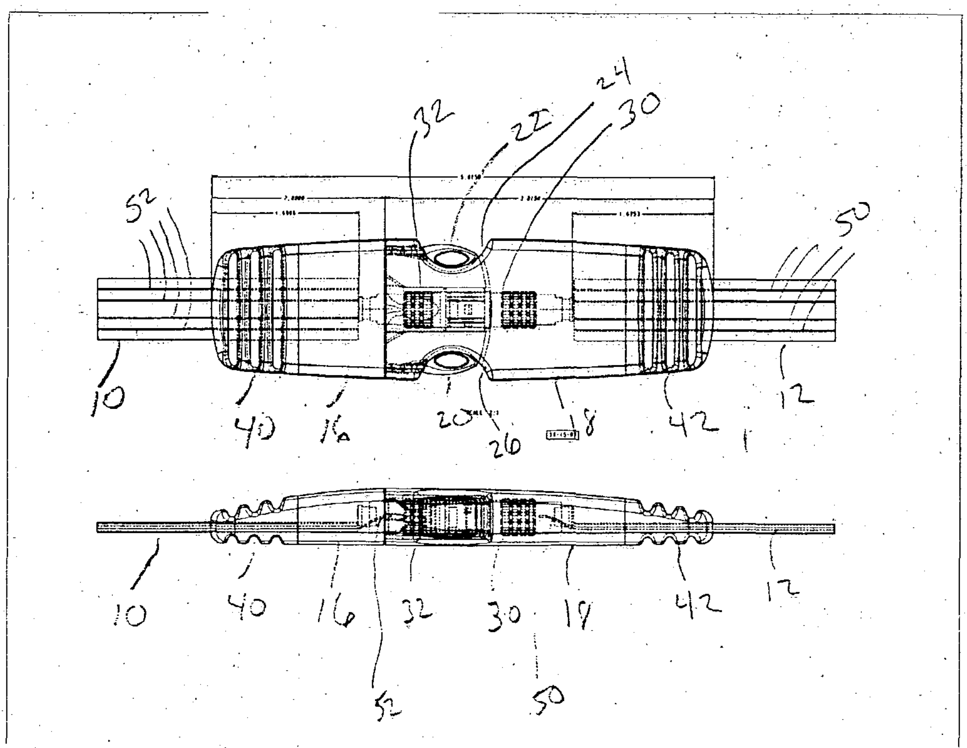


Fig 5

Fig 6

Figure 19: Schematic of First Attempt at Enclosing 0K Lemo Connector Using WSR-25 Connector as a Baseline. *(This information is proprietary to Foster-Miller)*

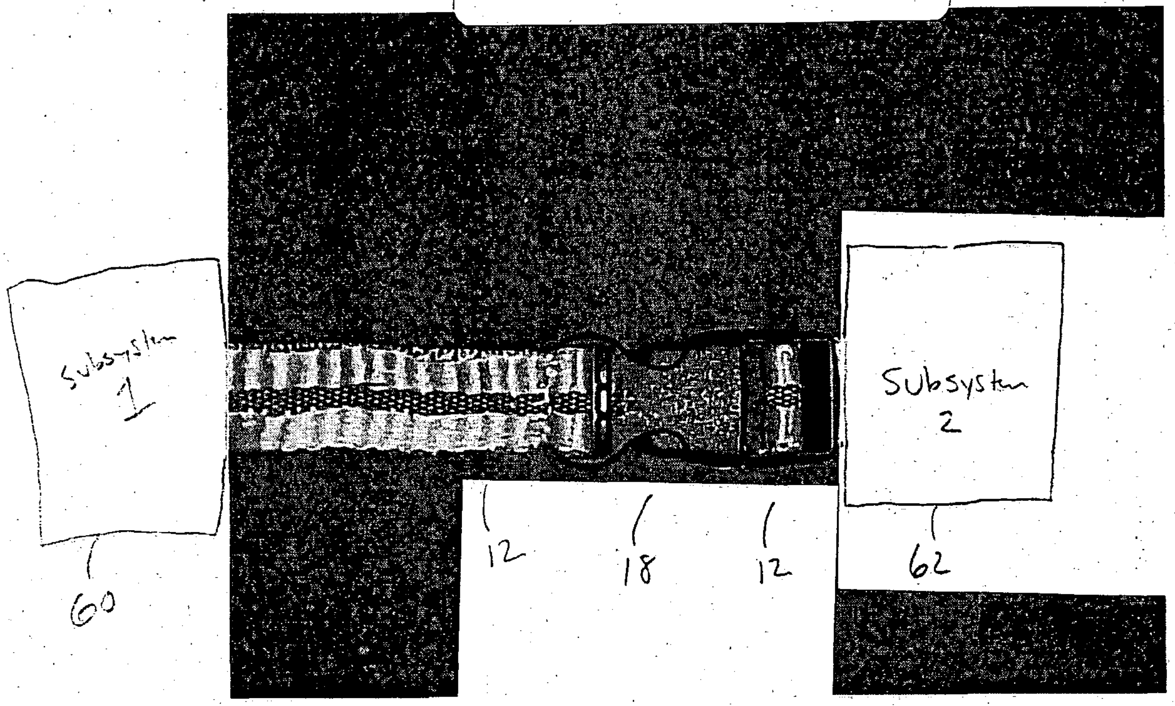


Fig 7

10

Figure 4: Top View of Buckle Concept for Power Transmission Using Loosely Woven Aracon Bus. *(This information is proprietary to Foster-Miller)*

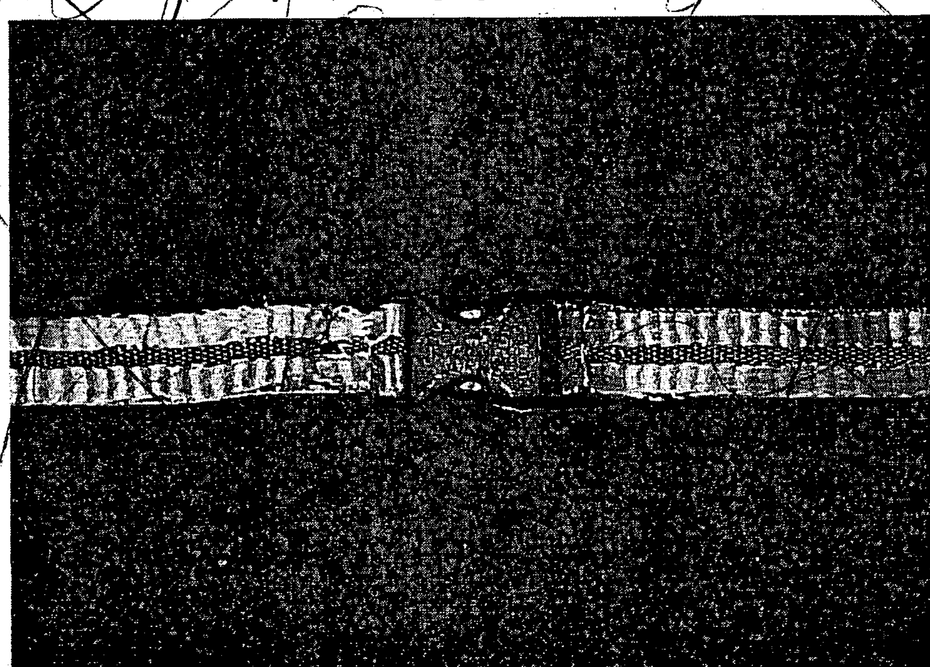


Figure 5: Bottom View of Buckle Concept for Power Transmission Using Loosely Woven Aracon Bus. *(This information is proprietary to Foster-Miller)*

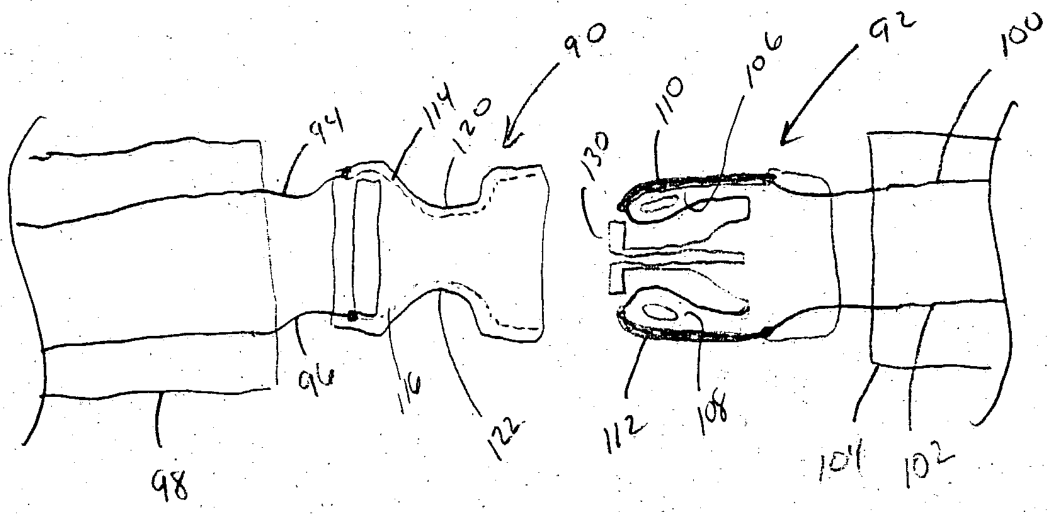


Fig 8

~~Fig 9~~

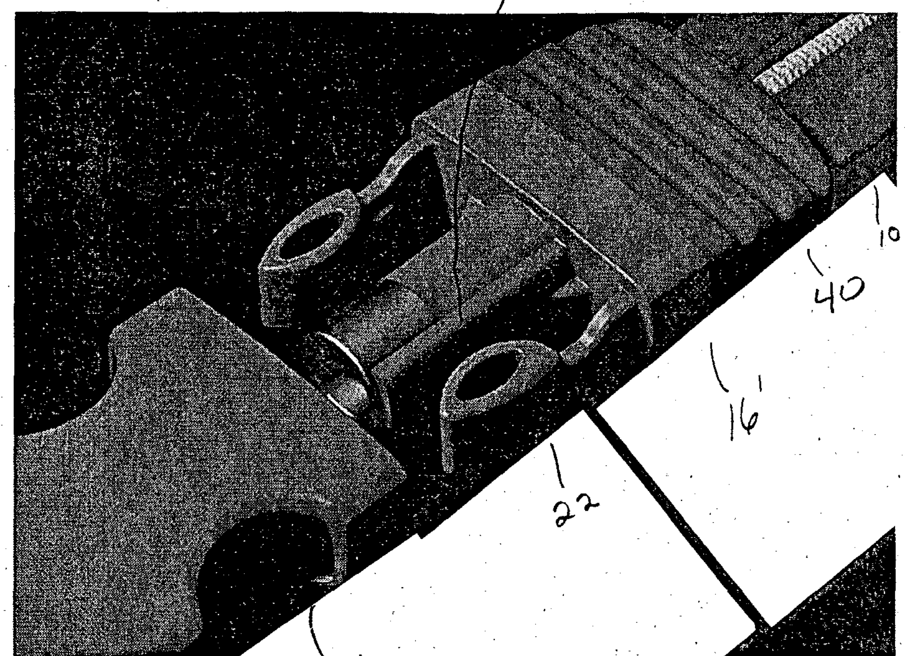


Fig 9A

9A

Figure 42: Improve… …ed on Barrel of the Lemo Connector. *(This … …ller)*

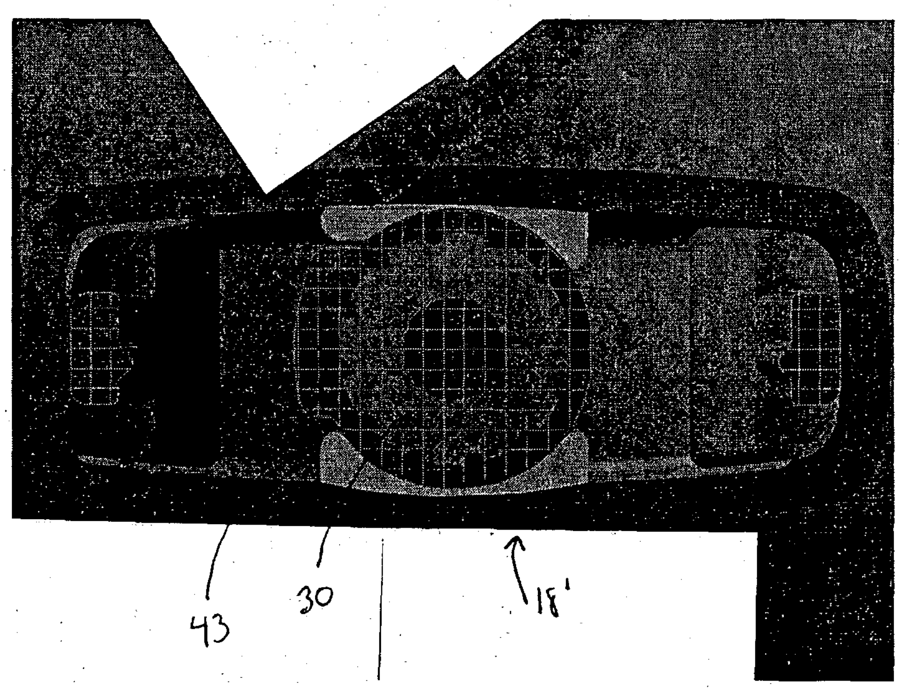


Fig 9B

Figure 4 … *nformation is proprietc*

figure 10 (a) Sliding Plastic Buckle Connector

female

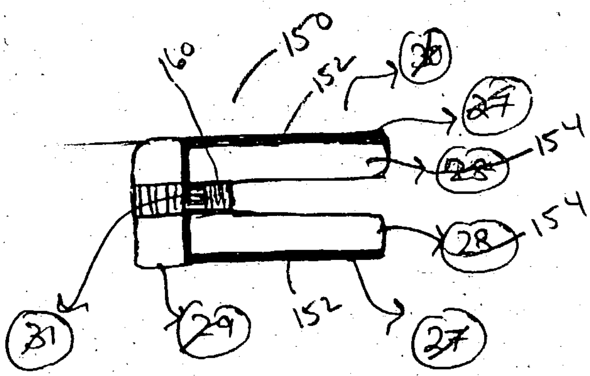


Fig 10

figure 11

Male

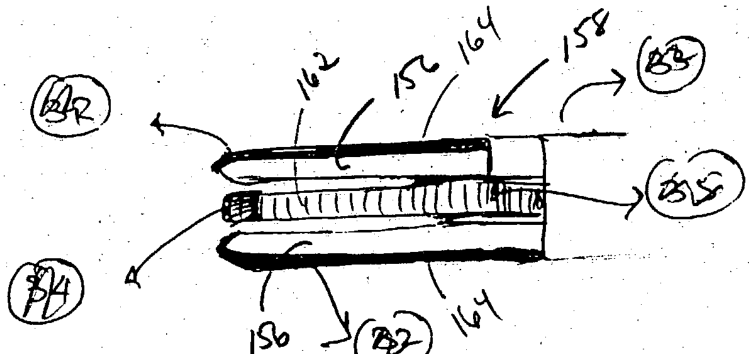


Fig 11

Figure 12 Power Transfer (Male Assembly Cable)

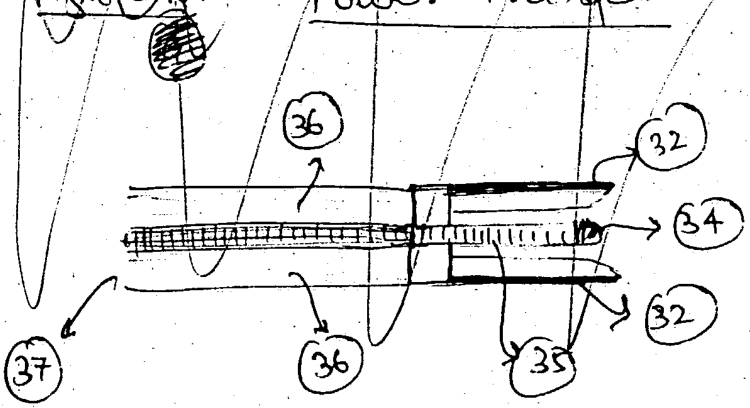


Fig 11

Applicant: Wilson-Nguyen *et al.*
Title: Textile electronic connection system
Docket No.: FM-220J
Attorney: Kirk Teska, Reg. No. 36,291
Page 8 of 12

Snap Connector for ... a Transfer

figure 1 — Side Profile — Fig 12

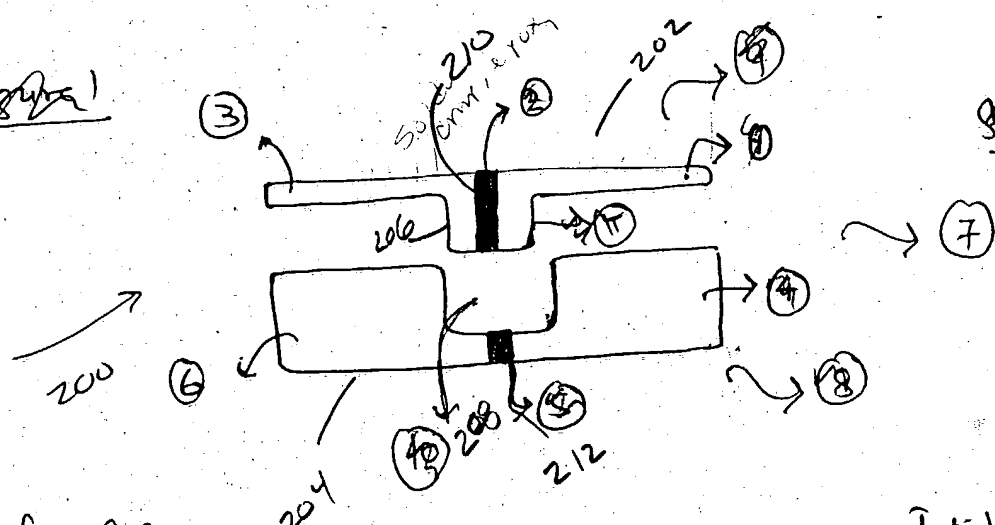


figure 2 — Top View of Top Snap — Fig 13

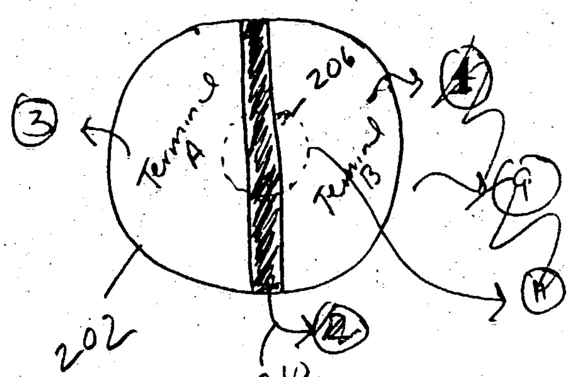


figure 3 — Top View of Bottom Snap — Fig 14

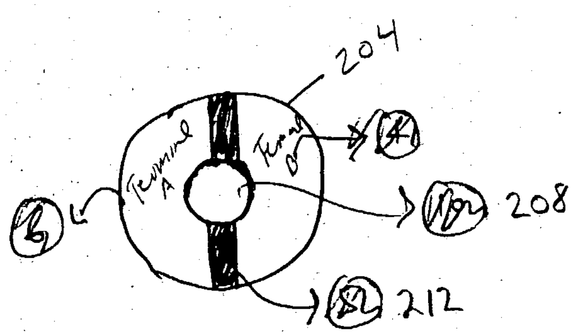
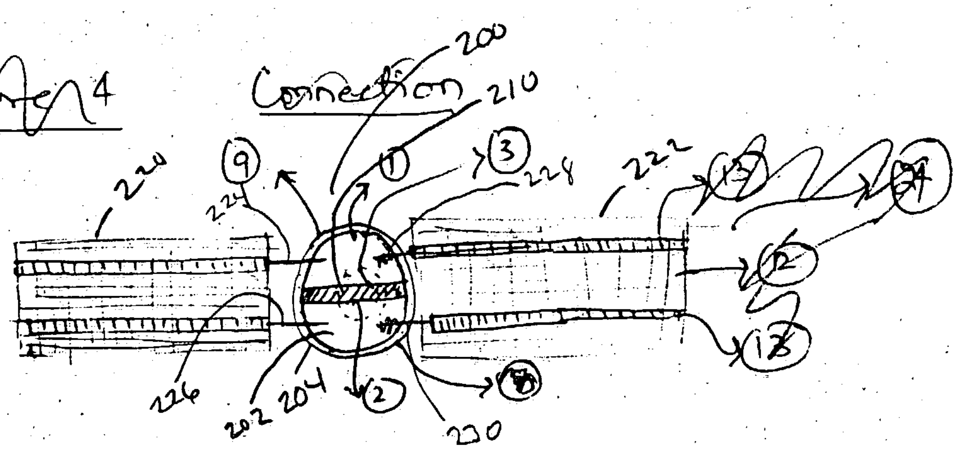


figure 4 — Connection — Fig 15



Applicant: Wilson-Nguyen *et al.*
Title: Textile electronic connection system
Docket No.: FM-220J
Attorney: Kirk Teska, Reg. No. 36,291
Page 9 of 12

Snap Connect… er / Data Transfer

Figure 5

(Ring)
~~Top Part of Snap Connector~~

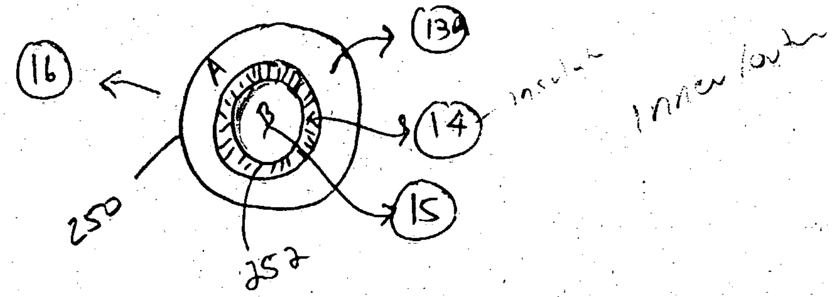


Fig 16

Figure 6 ~~Side View of Top Ring~~

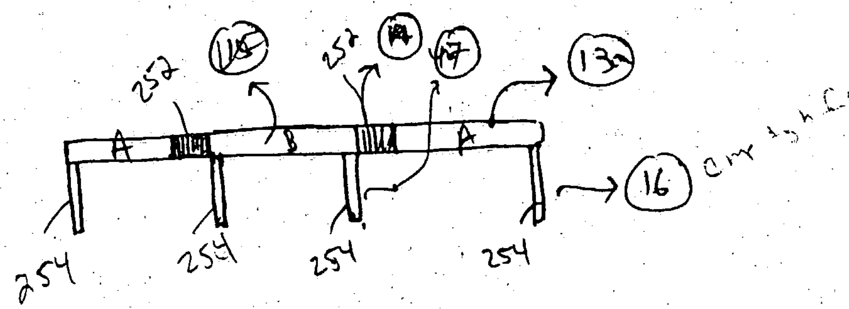


Fig 17

Figure 7 ~~Bottom Ring of Snap Connector (Bottom View)~~

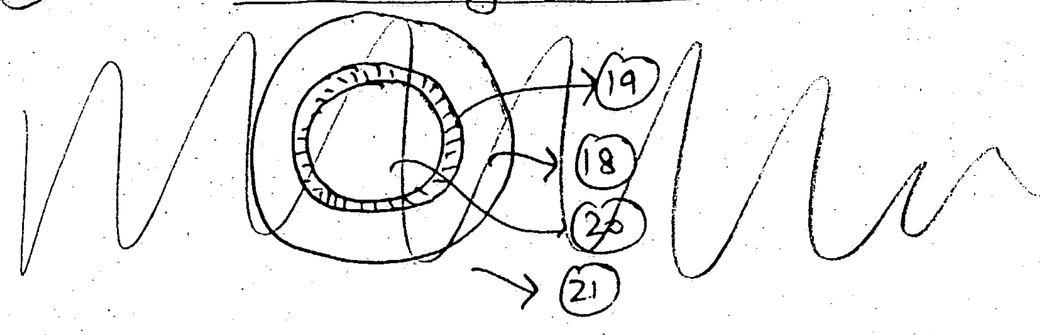


Fig 17

Figure 8 ~~Side View of Bottom Ring~~

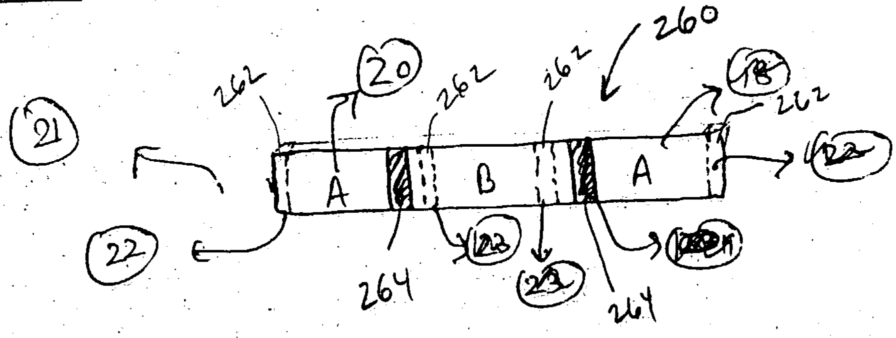


Fig 18

Applicant: Wilson-Nguyen *et al.*
Title: Textile electronic connection system
Docket No.: FM-220J
Attorney: Kirk Teska, Reg. No. 36,291

Figure 15

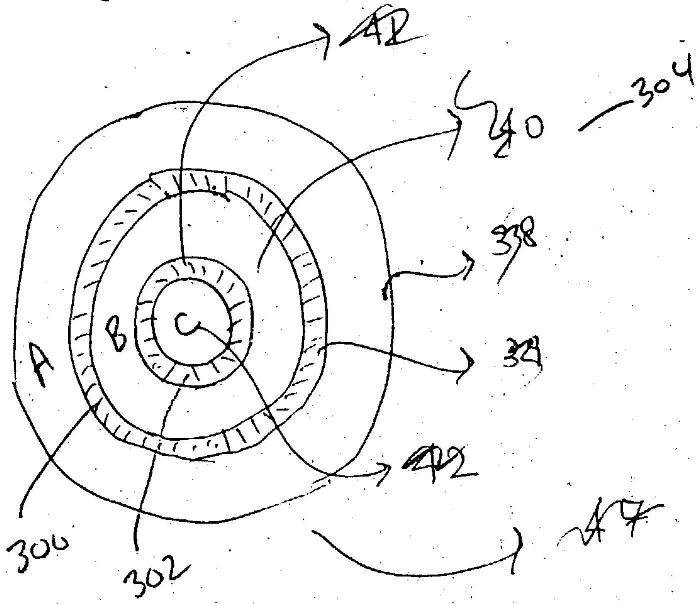


Fig 19

Figure 16

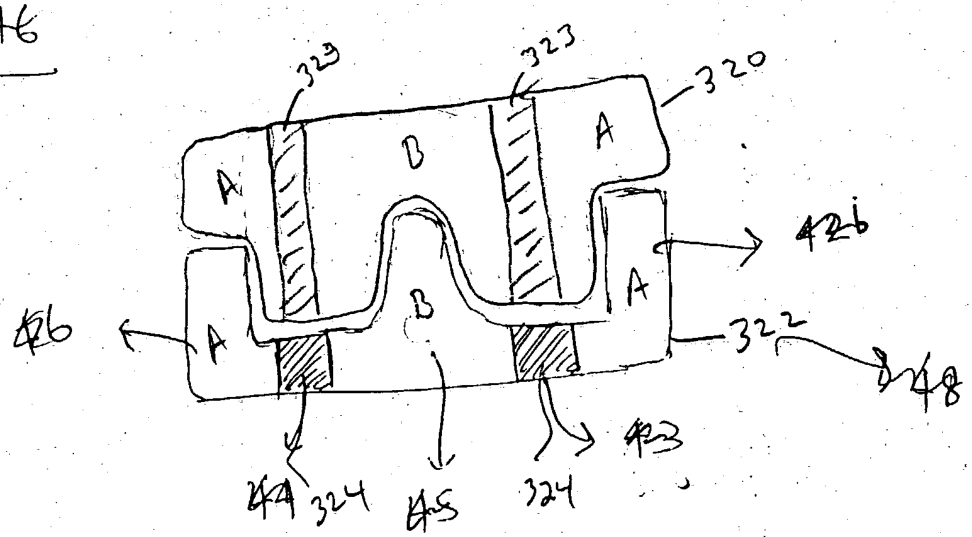


Fig 20

Figure 17a

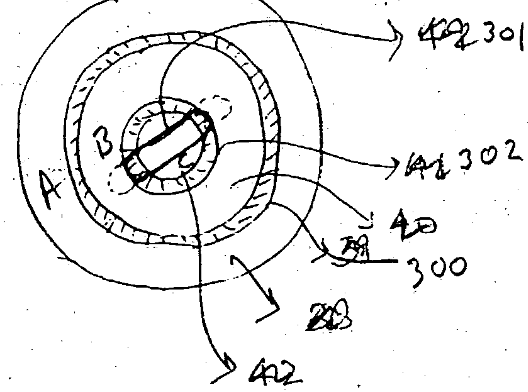


Fig 21

~~Figure 18~~

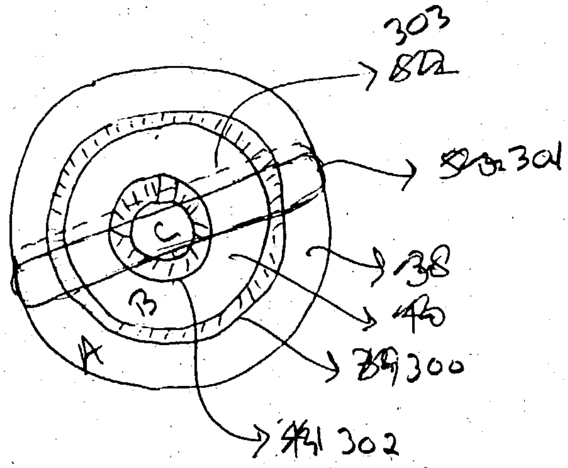
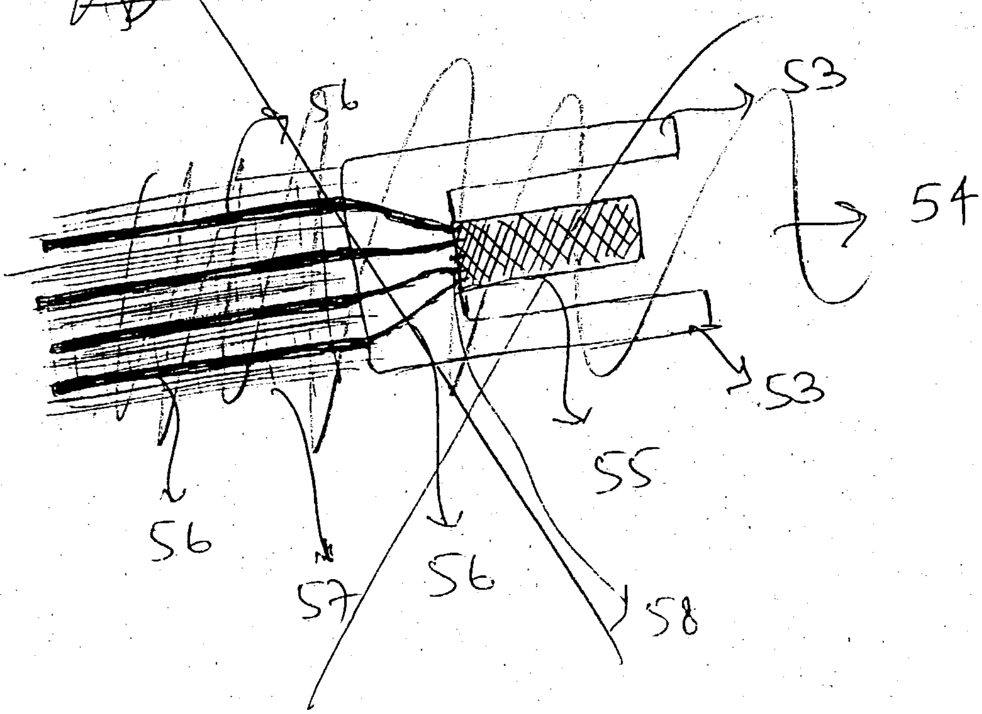


Fig 22

~~Figure 19~~



In an other embodiment, both ...nectors are designed to be impedance controlled (eg. for low-level signal or high frequency applications). In this embodiment, both the male and female connector has a center conductive pin/receptacle, and a conductive shell (jacket) separated by an insulating dielectric.The following formula can be used for calculating the characteristic impedance of a coaxial construction. (formula taken from Reference Data for Radio Engineers book published by Howard W. Sams & Co. 1975, page 24-21).

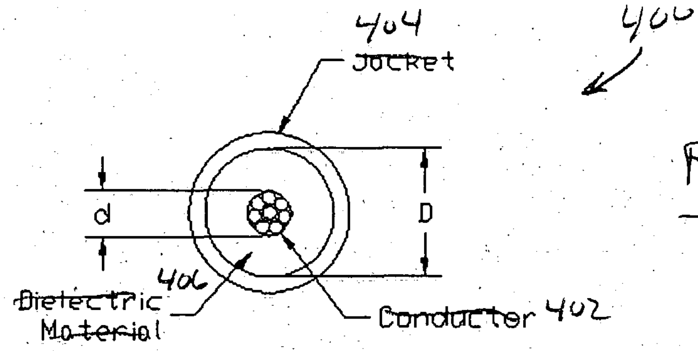


Fig 23

Characteristic Impedance (Zo): $Zo = \sqrt{\frac{138}{\varepsilon}} \times \mathrm{Log}_{10} \frac{D}{d}$ in ohms

Where:

d = outer diameter of inner (center) conductor (approximate value for stranded)
D = outer diameter of dielectric
ε = dielectric constant (ε=1 for air)

This equation supports the fact that the characteristic impedance of a coax cable is directly related to the diameter of the conductor and the dielectric. For component video cables, this characteristic impedance should be 75-ohms. With characteristic impedance (Zo) held at a constant 75-ohms, the variables are the diameters and dielectric constant.